

**GENERAL DESCRIPTION**

The RM733/RC733 integrated circuit is a monolithic video amplifier with differential inputs and differential outputs. It offers three selectable voltage gains of 10, 100, or 400 and adjustable gain of 10 to 400 using a single resistor. No external frequency compensation is necessary for any gain option. The circuit and process designs are optimized to give a stable gain ( $\pm 10\%$ ), wide bandwidth (DC to 120MHz), high input resistance (250k $\Omega$ ), and low phase shift that is linear up to 10MHz (2° per MHz).

The RM733/RC733 is designed for use as a read head amplifier for magnetic tape, drum, or disc memories using phase of NRZ encoding. It will also function as a preamplifier for high speed film or plated wire memory systems; as a video or pulse amplifier, pulse height detector, peak detector.

Applications for the RM733/RC733 include bulk computer

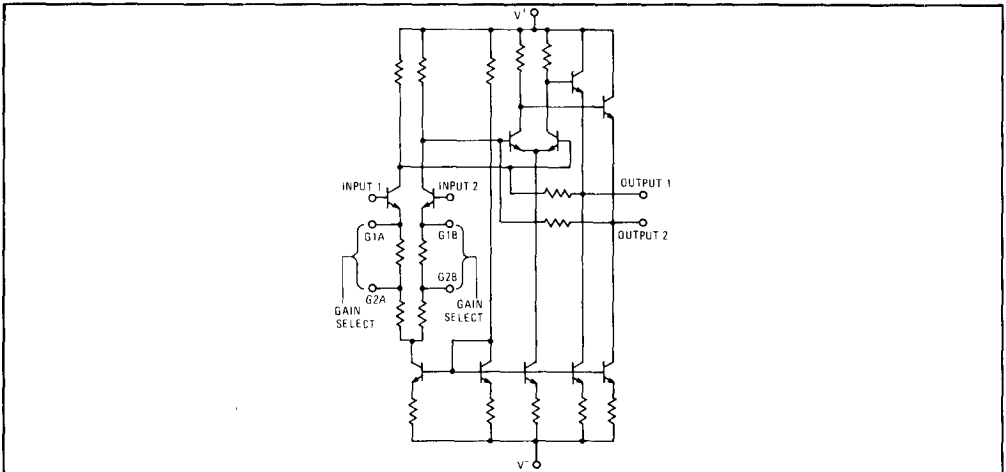
memory systems, very high speed random access memory systems, communications systems, nuclear event instrumentation, frequency counters, and other systems where the specific design features of the RM733/RC733 are required.

The RM733 video amplifier will operate over the complete military temperature range from -55°C to +125°C while the commercial version, the RC733, operates from 0°C to +70°C.

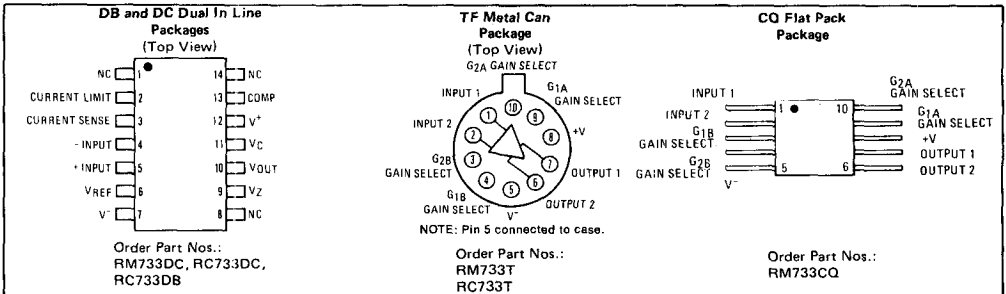
**DESIGN FEATURES**

- Wide Bandwidth DC to 120MHz
- Low Linear Phase Shift 2 $\pi$ /MHz to 10MHz
- Selectable Voltage Gains 10, 100, or 400
- Excellent Pulse Characteristics
- High Input Resistance 250k $\Omega$

**SCHEMATIC DIAGRAM**



**CONNECTION INFORMATION**



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage . . . . .	±8.0V	Operating Temperature Range	
Differential Input Voltage . . . . .	±5.0V	RM733 . . . . .	-55°C to +125°C
Common Mode Input Voltage . . . . .	±6.0V	RC733 . . . . .	0°C to +70°C
Input Current . . . . .	10mA	Storage Temperature Range . . . . .	-65°C to +150°C
Internal Power Dissipation Metal Can (Note 1) . . . . .	500mW	Lead Temperature (Soldering, 60s) . . . . .	300°C
Flat Pack . . . . .	570mW		

## ELECTRICAL CHARACTERISTICS (Note 2)

PARAMETER	(Note 3)	CONDITIONS	RM733			RC733			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Differential Voltage Gain	Gain 1		300	400	500	250	400	600	
	Gain 2		90	100	110	80	100	120	
	Gain 3		9.0	10	11	8.0	10	12	
Bandwidth	Gain 1	R <sub>S</sub> = 50Ω		40			40		MHz
	Gain 2			90			90		
	Gain 3			120			120		
Risetime	Gain 1	R <sub>S</sub> = 50Ω, V <sub>OUT</sub> = 1V <sub>PP</sub>		10.5			10.5		ns
	Gain 2			4.5	10		4.5	12	
	Gain 3			2.5			2.5		
Propagation Delay	Gain 1	R <sub>S</sub> = 50Ω, V <sub>OUT</sub> = 1V <sub>PP</sub>		7.5			7.5		ns
	Gain 2			6.0	10		6.0	10	
	Gain 3			3.6			3.6		
Input Resistance	Gain 1			4.0			4.0		kΩ
	Gain 2		20	30		10	30		
	Gain 3			250			250		
Input Capacitance		Gain 2		2.0			2.0		pF
Input Offset Current				0.4	3.0		0.4	5.0	μA
Input Bias Current				9.0	20		9.0	30	μA
Input Noise Voltage		R <sub>S</sub> = 50Ω, BW = 1kHz to 10MHz		12			12		μV <sub>rms</sub>
Input Voltage Range			±1.0			±1.0			V
Common Mode Rejection Ratio	Gain 2	V <sub>CM</sub> = ±1V, R ≤ 100kHz	60	86		60	86		dB
		V <sub>CM</sub> = ±1V, f = 5MHz		60			60		
Supply Voltage Rejection Ratio	Gain 2	ΔV <sub>S</sub> = ±0.5V	50	70		50	70		dB
Output Offset Voltage	Gain 1			0.6	1.5		0.6	1.5	V
	Gain 2			0.35	1.0		0.35	1.5	
	Gain 3								
Output Common Mode Voltage			2.4	2.9	3.4	2.4	2.9	3.4	V
Output Voltage Swing			3.0	4.0		3.0	4.0		V <sub>PP</sub>
Output Sink Current			2.5	3.6		2.5	3.6		mA
Output Resistance				20			20		Ω
Power Supply Current				18	24		18	24	mA

### NOTES:

- For RM733 the rating applies for case temperature to +125°C; derate RM733T linearly at 6.5 mW/°C for ambient temperature above 75°C. For RC733T, the rating applies for ambient temperatures to 70°C. For RM733CQ, derate linearly at 7.2 mW/°C for ambient temperature above 75°C.
- V<sub>S</sub> = ±6.0V; T<sub>A</sub> = 25°C unless otherwise noted.
- Gain 1: G1A and G1B connected together; Gain 2: G2A and G2B connected together; Gain 3: Gain select pins open.



**ELECTRICAL CHARACTERISTICS**(The following specifications apply for  $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$  for the RM733 and  $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$  for the RC733,  $V_S = \pm 6.0\text{V}$ )

PARAMETER	CONDITIONS	LM733			LM733C			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Differential Voltage Gain								
Gain 1		200		600	250		600	
Gain 2		80		120	80		120	
Gain 3		8.0		12.0	8.0		12.0	
Input Resistance Gain 2		8			8			$k\Omega$
Input Offset Current				5			6	$\mu\text{A}$
Input Bias Current				40			40	$\mu\text{A}$
Input Voltage Range		$\pm 1$			$\pm 1$			V
Common-Mode Rejection Ratio								
Gain 2		50			50			dB
Supply Voltage Rejection Ratio								
Gain 2		50			50			db
Output Offset Voltage								
Gain 1				1.5			1.5	V
Gain 2 and 3				1.2			1.5	V
Output Voltage Swing		2.5			2.8			V p-p
Output Sink Current		2.2			2.5			mA
Power Supply Current				27			27	mA